

DX-Cartridge

Safety Data Sheet

A safety data sheet is not required for this product. This document was created on a voluntary basis
Issue date: 08/01/2026 Revision date: 08/01/2026 Version: 4.1

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form Article
Name DX-Cartridge
Product code BU Direct Fastening

1.2. Relevant identified uses of the substance or mixture and uses advised against

1.2.1. Relevant identified uses

Use of the substance/mixture CARTRIDGES FOR TOOLS, BLANK

1.2.2. Uses advised against

Restrictions on use For professional use only

1.3. Details of the supplier of the safety data sheet

Supplier

Hilti (Gt. Britain) Ltd.
1 Circle Square
3 Symphony Park
GB M1 7FS Manchester
Great Britain
T +44 161 886 1000
0800 886 100 Toll-free, F +44 161 872 1240
gbsales@hilti.com

Department issuing data specification sheet

Hilti AG
Feldkircherstraße 100
FL 9494 Schaan
Liechtenstein
T +423 234 2111
product.compliance-direct.fastening@hilti.com

1.4. Emergency telephone number

Emergency number Emergency CONTACT (24-Hour-Number):
GBK GmbH Global Regulatory Compliance
+49 (0)6132-84463

+44 161 886 1000
0800 886 100 Toll-free

| Country | Organisation/Company | Address | Emergency number | Comment |
|----------------|---|---------|------------------|---------|
| United Kingdom | NHS Direct (England and Wales) NHS 24 (Scotland) | | 111 | |

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Explosives, Division 1.4 H204

Full text of H- and EUH-statements: see section 16

Adverse physicochemical, human health and environmental effects

Fire or projection hazard.

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2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP)



GHS01

Signal word (CLP)

Hazard statements (CLP)

Precautionary statements (CLP)

Warning

H204 - Fire or projection hazard.

P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources.

No smoking.

P250 - Do not subject to grinding, friction, shock.

P280 - Wear eye protection.

P370+P380+P375 - In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion.

P372 - Explosion risk.

P401 - Store in accordance with local regulations on explosives.

Category of the pyrotechnic article: other pyrotechnic articles Cat. P1

(BAM EC-Type-Examination Certificate No. 0589.PYR.3800/12 or 0589.PYR.3804/12 respectively).

Extra phrases

2.3. Other hazards

Other hazards which do not result in classification

This article contains hazardous substances or preparations not intended to be released under normal or reasonably foreseeable conditions of use. The dismantling of the article is prohibited!. Keep away from ignition sources (including static discharges).

This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII

This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII

Contains no PBT and/or vPvB substances $\geq 0.1\%$ assessed in accordance with REACH Annex XIII

| Component | |
|-------------------------------|---|
| cellulose nitrate (9004-70-0) | This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII |
| glycerol trinitrate (55-63-0) | This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII |
| Lead styphnate (15245-44-0) | This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII |
| Barium nitrate (10022-31-8) | This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII |
| copper (7440-50-8) | This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII |
| zinc (7440-66-6) | This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII |
| Diphenylamine (122-39-4) | This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII |
| tetrazene (109-27-3) | This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII |

The substance is not included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605

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| Component | |
|-------------------------------|---|
| cellulose nitrate (9004-70-0) | The substance is not included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 |
| glycerol trinitrate (55-63-0) | The substance is not included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 |
| Lead styphnate (15245-44-0) | The substance is not included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 |
| Barium nitrate (10022-31-8) | The substance is not included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 |
| copper (7440-50-8) | ED: not yet assessed |
| zinc (7440-66-6) | The substance is not included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 |
| Diphenylamine (122-39-4) | The substance is not included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 |
| tetrazene (109-27-3) | The substance is not included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 |

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

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3.2. Mixtures

Comments

max. net explosives weight each cartridge in mg:
Caliber 6.8/11 (cal .27 short) white: 130; brown: 140; green: 160; yellow: 180; red: 230;
titanium: 230; black: 260
Caliber 6.8/18 (cal .27 long) green: 190; yellow: 220; blue: 300; red: 330; black: 410
Caliber 6.3/10 (cal. 25) green 120; yellow: 190; red: 230; black: 250
Caliber 5.5/16 (cal .22) grey: 105; brown: 120; green: 175; yellow: 210; red: 270
Within the cartridges the explosive ingredients (gun powder and priming composition) are hermetically separated from the environment. They will be only opened with effort and under destruction of the article.
Propellant powder: glycerol trinitrate containing nitrocellulose powder
Mass per cartridge: essentially dependent on the required power (100-400 mg)
Exposed propellant powder outside a cartridge is harmful if swallowed and highly flammable; without tamping no explosion risk.
Packed safety cartridges don't represent a significant risk.
In case of reaction no dangerous fragments or projectiles will be formed.
Mechanical or thermal attempts to expose the primer composition lead to an immediate reaction of the dangerous ingredients.

| Name | Product identifier | % | Classification according to Regulation (EC) No. 1272/2008 [CLP] |
|--|--|---------|---|
| cellulose nitrate | CAS-No.: 9004-70-0 | 5 – 17 | Expl. 1.1, H201 |
| glycerol trinitrate | CAS-No.: 55-63-0 EC-No.: 200-240-8 EC Index-No.: 603-034-00-X REACH-no: 01-2119488893-18 | 2 – 7 | Unst. Expl., H200 Acute Tox. 2 (Oral), H300 (ATE=5 mg/kg bodyweight) Acute Tox. 1 (Dermal), H310 (ATE=5 mg/kg bodyweight) Acute Tox. 2 (Inhalation:dust,mist), H330 (ATE=0.05 mg/l/4h) STOT RE 2, H373 Aquatic Chronic 2, H411 |
| Lead styphnate substance listed on REACH Candidate List | CAS-No.: 15245-44-0 EC-No.: 239-290-0 EC Index-No.: 609-019-00-4 REACH-no: 01-2119543737-30 | 0.1 – 3 | Unst. Expl., H200 Acute Tox. 4 (Oral), H302 (ATE=500 mg/kg bodyweight) Acute Tox. 4 (Inhalation:dust,mist), H332 (ATE=1.5 mg/l/4h) Repr. 1A, H360Df STOT RE 2, H373 Aquatic Acute 1, H400 Aquatic Chronic 1, H410 |
| Barium nitrate | CAS-No.: 10022-31-8 EC-No.: 233-020-5 | 0 – 3 | Ox. Sol. 2, H272 Acute Tox. 3 (Oral), H301 (ATE=100 mg/kg bodyweight) Acute Tox. 4 (Inhalation), H332 (ATE=1.5 mg/l/4h) Eye Irrit. 2, H319 |
| copper | CAS-No.: 7440-50-8 EC-No.: 231-159-6 | 0 – 2 | Aquatic Acute 1, H400 (M=10) Aquatic Chronic 3, H412 |
| zinc | CAS-No.: 7440-66-6 EC-No.: 231-175-3 EC Index-No.: 030-001-01-9 | 0 – 2 | Aquatic Acute 1, H400 Aquatic Chronic 1, H410 |

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| Name | Product identifier | % | Classification according to Regulation (EC) No. 1272/2008 [CLP] |
|---------------|--|-------|---|
| Diphenylamine | CAS-No.: 122-39-4 EC-No.: 204-539-4 EC Index-No.: 612-026-00-5 REACH-no: 01-2119488966-13 | 0 – 1 | Acute Tox. 3 (Oral), H301 (ATE=100 mg/kg bodyweight) Acute Tox. 3 (Dermal), H311 (ATE=300 mg/kg bodyweight) Acute Tox. 3 (Inhalation:dust,mist), H331 (ATE=0.5 mg/l/4h) Eye Irrit. 2, H319 Carc. 2, H351 STOT RE 2, H373 Aquatic Acute 1, H400 Aquatic Chronic 1, H410 |
| tetrazene | CAS-No.: 109-27-3 | 0 – 1 | Unst. Expl., H200 Eye Irrit. 2, H319 Aquatic Acute 1, H400 Aquatic Chronic 1, H410 |

Full text of H- and EUH-statements: see section 16

SECTION 4: First aid measures

4.1. Description of first aid measures

| | |
|---------------------------------------|---|
| First-aid measures general | In all cases of doubt, or when symptoms persist, seek medical attention. |
| First-aid measures after inhalation | Allow affected person to breathe fresh air. Allow the victim to rest. |
| First-aid measures after skin contact | Remove affected clothing and wash all exposed skin area with mild soap and water, followed by warm water rinse. |
| First-aid measures after eye contact | Rinse immediately with plenty of water. Obtain medical attention if pain, blinking or redness persists. |
| First-aid measures after ingestion | Rinse mouth. Do NOT induce vomiting. Obtain emergency medical attention. |

4.2. Most important symptoms and effects, both acute and delayed

| | |
|------------------|--|
| Symptoms/effects | Not expected to present a significant hazard under anticipated conditions of normal use. |
|------------------|--|

4.3. Indication of any immediate medical attention and special treatment needed

No additional information available.

SECTION 5: Firefighting measures

5.1. Extinguishing media

| | |
|--------------------------------|----------------------------------|
| Suitable extinguishing media | Dry powder. Water spray. |
| Unsuitable extinguishing media | Do not use a heavy water stream. |

5.2. Special hazards arising from the substance or mixture

| | |
|--|---|
| Hazardous decomposition products in case of fire | Carbon monoxide. Carbon dioxide (CO ₂). Nitrous gasses. |
|--|---|

5.3. Advice for firefighters

| | |
|--------------------------------|---|
| Firefighting instructions | Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire fighting water from entering the environment. |
| Protection during firefighting | Do not enter fire area without proper protective equipment, including respiratory protection. |

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SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures Remove ignition sources. Use special care to avoid static electric charges. No open flames.
No smoking.

6.1.1. For non-emergency personnel

Protective equipment Wear recommended personal protective equipment.
Emergency procedures Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment Equip cleanup crew with proper protection.
Emergency procedures Ventilate area.

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up Pick up loose cartridges only by hand.
Exposed ingredients must be swept up carefully and phlegmatized in a water container, labelled according the regulations, wipe down with water the contaminated area. Store away from other materials.

6.4. Reference to other sections

For further information refer to section 8: "Exposure controls/personal protection". For further information refer to section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed Hazardous waste due to potential risk of explosion.
Precautions for safe handling Do not subject to grinding, shock, friction. Take precautionary measures against static discharge. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work.
Hygiene measures Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions Keep only in the original container in a cool, well ventilated place away from : Direct sunlight, Heat sources. Store in a dry place.
Incompatible products Strong bases. Strong acids.
Storage temperature 5 – 25 °C
Information on mixed storage Keep away from : Ignition sources. Do not store with: Store according to local legislation.
Storage area Store away from heat.

7.3. Specific end use(s)

No additional information available.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

8.1.1. National occupational exposure and biological limit values

| glycerol trinitrate (55-63-0) | |
|--|-------------------------|
| EU - Indicative Occupational Exposure Limit (IOEL) | |
| Local name | Glycerol trinitrate |
| IOEL TWA | 0.095 mg/m ³ |

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| glycerol trinitrate (55-63-0) | |
|---|---|
| | 0.01 ppm |
| IOEL STEL | 0.19 mg/m ³ |
| | 0.02 ppm |
| Remark | Skin |
| Regulatory reference | COMMISSION DIRECTIVE (EU) 2017/164 |
| United Kingdom - Occupational Exposure Limits | |
| Local name | Glycerol trinitrate |
| WEL TWA (OEL TWA) | 0.095 mg/m ³ |
| | 0.01 ppm |
| WEL STEL (OEL STEL) | 0.19 mg/m ³ |
| | 0.02 ppm |
| Remark | Sk (Can be absorbed through the skin. The assigned substances are those for which there are concerns that dermal absorption will lead to systemic toxicity) |
| Regulatory reference | EH40/2005 (Fourth edition, 2020). HSE |
| United Kingdom - Biological limit values | |
| Local name | Glycerol trinitrate (Nitroglycerin) |
| BMGV | 15 µmol/mol creatinine Parameter: total nitroglycerols - Medium: urine - Sampling time: At the end of the period of exposure |
| Regulatory reference | EH40/2005 (Fourth edition, 2020). HSE |
| Barium nitrate (10022-31-8) | |
| EU - Indicative Occupational Exposure Limit (IOEL) | |
| Local name | Barium (soluble compounds as Ba) |
| IOEL TWA | 0.5 mg/m ³ |
| Regulatory reference | COMMISSION DIRECTIVE 2006/15/EC |
| copper (7440-50-8) | |
| EU - Indicative Occupational Exposure Limit (IOEL) | |
| Local name | Copper |
| IOEL TWA | 0.01 mg/m ³ (respirable fraction) |
| Remark | (Year of adoption 2014) |
| Regulatory reference | SCOEL Recommendations |
| United Kingdom - Occupational Exposure Limits | |
| Local name | Copper |
| WEL TWA (OEL TWA) | 0.2 mg/m ³ fume (as Cu) |
| WEL STEL (OEL STEL) | 2 mg/m ³ and compounds, dusts and mists (as Cu) |
| Regulatory reference | EH40/2005 (Fourth edition, 2020). HSE |

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| Diphenylamine (122-39-4) | |
|--|---------------------------------------|
| United Kingdom - Occupational Exposure Limits | |
| Local name | Diphenylamine |
| WEL TWA (OEL TWA) | 10 mg/m ³ |
| WEL STEL (OEL STEL) | 20 mg/m ³ |
| Regulatory reference | EH40/2005 (Fourth edition, 2020). HSE |

8.1.2. Recommended monitoring procedures

No additional information available

8.1.3. Air contaminants formed

No additional information available

8.1.4. DNEL and PNEC

No additional information available

8.1.5. Control banding

No additional information available

8.2. Exposure controls

8.2.1. Appropriate engineering controls

Appropriate engineering controls:

No additional information available.

8.2.2. Personal protection equipment

Personal protective equipment:

When using cartridge operated tools, sufficient ear protection must be worn.

Personal protective equipment symbol(s):



8.2.2.1. Eye and face protection

Eye protection:

Chemical goggles or safety glasses. ISO 16321-1

8.2.2.2. Skin protection

Skin and body protection:

When using cartridge operated tools, sufficient ear protection must be worn.

Hand protection:

Not required for normal conditions of use

8.2.2.3. Respiratory protection

Respiratory protection:

Respiratory protection not required in normal conditions

8.2.2.4. Thermal hazards

Thermal hazard protection:

No information available.

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8.2.3. Environmental exposure controls

Environmental exposure controls:

Avoid release to the environment.

Other information:

Do not eat, drink or smoke during use.

No additional information available

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

| | |
|---|---|
| Physical state | Solid |
| Colour | According to product specification. |
| Odour | There may be no odour warning properties, odour is subjective and inadequate to warn of overexposure. |
| Odour threshold | Not available |
| Melting point | Not available |
| Freezing point | Not available |
| Boiling point | Not available |
| Flammability | Not available |
| Explosive properties | Fire or projection hazard. |
| Lower explosion limit | Not applicable |
| Upper explosion limit | Not applicable |
| Flash point | Not applicable |
| Auto-ignition temperature | Not applicable |
| Decomposition temperature | Not available |
| pH | Not available |
| pH solution | Not available |
| Viscosity, kinematic | Not applicable |
| Solubility | Not available |
| Partition coefficient n-octanol/water (Log Kow) | Not available |
| Vapour pressure | Not available |
| Vapour pressure at 50°C | Not available |
| Density | Not available |
| Relative density | Not available |
| Relative vapour density at 20°C | Not applicable |
| Particle size | Not available |
| Particle size distribution | Not available |
| Particle shape | Not available |
| Particle aspect ratio | Not available |
| Particle specific surface area | Not available |
| Particle dustiness | Not available |

9.2. Other information

9.2.1. Information with regard to physical hazard classes

No additional information available

9.2.2. Other safety characteristics

Additional information Not applicable. Article

SECTION 10: Stability and reactivity

10.1. Reactivity

Fire or projection hazard.

10.2. Chemical stability

Stable under normal conditions.

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10.3. Possibility of hazardous reactions

Risk of explosion by shock, friction, fire or other sources of ignition. Heating may cause an explosion. At high temperatures : > 150 °C Response.

10.4. Conditions to avoid

Extremely high or low temperatures. Heat. Sparks. Open flame. Overheating. Avoid contact with hot surfaces. No flames, no sparks. Eliminate all sources of ignition.

10.5. Incompatible materials

Strong acids. Strong bases.

10.6. Hazardous decomposition products

Carbon monoxide. Carbon dioxide. Nitrogen oxides. Metal oxides. Thermal decomposition can lead to the release of irritating gases and vapours.

SECTION 11: Toxicological information

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

| | |
|-----------------------------|---|
| Acute toxicity (oral) | Not classified (Based on available data, the classification criteria are not met) |
| Acute toxicity (dermal) | Not classified (Based on available data, the classification criteria are not met) |
| Acute toxicity (inhalation) | Not classified (Based on available data, the classification criteria are not met) |

| glycerol trinitrate (55-63-0) | |
|-------------------------------|---|
| LD50 oral | 685 mg/kg |
| LD50 dermal rat | > 9560 mg/kg bodyweight (OECD 402 method) |
| LD50 dermal | 9560 mg/kg |

| Lead styphnate (15245-44-0) | |
|-----------------------------------|---|
| LD50 oral rat | > 2000 mg/kg bodyweight |
| LD50 dermal rat | > 2000 mg/kg bodyweight (OECD 402 method) |
| LC50 Inhalation - Rat (Dust/Mist) | > 5.05 mg/l/4h (OECD 403 method) |

| Barium nitrate (10022-31-8) | |
|-----------------------------|-----------|
| LD50 oral | 355 mg/kg |

| Diphenylamine (122-39-4) | |
|--------------------------|------------------------|
| LD50 oral rat | > 800 mg/kg bodyweight |
| LD50 oral | 2480 mg/kg |
| LD50 dermal | 5000 mg/kg |

| | |
|-----------------------------------|---|
| Skin corrosion/irritation | Not classified (Based on available data, the classification criteria are not met) |
| Serious eye damage/irritation | Not classified (Based on available data, the classification criteria are not met) |
| Respiratory or skin sensitisation | Not classified (Based on available data, the classification criteria are not met) |
| Germ cell mutagenicity | Not classified (Based on available data, the classification criteria are not met) |
| Carcinogenicity | Not classified (Based on available data, the classification criteria are not met) |
| Reproductive toxicity | Not classified (Based on available data, the classification criteria are not met) |
| STOT-single exposure | Not classified (Based on available data, the classification criteria are not met) |
| STOT-repeated exposure | Not classified (Based on available data, the classification criteria are not met) |

| glycerol trinitrate (55-63-0) | |
|-------------------------------|--|
| STOT-repeated exposure | May cause damage to organs through prolonged or repeated exposure. |

| Lead styphnate (15245-44-0) | |
|-----------------------------|--|
| STOT-repeated exposure | May cause damage to organs through prolonged or repeated exposure. |

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| Diphenylamine (122-39-4) | |
|---------------------------------|---|
| STOT-repeated exposure | May cause damage to organs through prolonged or repeated exposure. |
| Aspiration hazard | Not classified (Based on available data, the classification criteria are not met) |

11.2. Information on other hazards

11.2.1. Endocrine disrupting properties

Adverse health effects caused by endocrine disrupting properties

No additional information available

11.2.2. Other information

Potential adverse human health effects and symptoms

No harmful effects are to be expected if used properly.
The contained ingredients can be harmful, but they are hermetically enclosed in the article and can not be released.
The dismantling of the article is prohibited.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general

No harmful effects are to be expected if used properly.
The contained ingredients can be harmful, but they are hermetically enclosed in the article and can not be released.

Hazardous to the aquatic environment, short-term (acute)

The dismantling of the article is prohibited.
Not classified (Based on available data, the classification criteria are not met)

Hazardous to the aquatic environment, long-term (chronic)

Not classified (Based on available data, the classification criteria are not met)

glycerol trinitrate (55-63-0)

| | |
|------------------------|---|
| LC50 - Fish [1] | 1.9 – 3.58 mg/l (96 h; Oncorhynchus mykiss; ASTM Designation E 729-80) |
| EC50 - Crustacea [1] | 17.83 mg/l (48 h; Ceriodaphnia dubia; ASTM Designation E 729-80) |
| EC50 96h - Algae [1] | 1.15 mg/l (Raphidocelis subcapitata; EPA TSCA Experimental Method 797.1060) |
| NOEC chronic fish | 0.03 mg/l |
| NOEC chronic crustacea | 3.23 mg/l (7 d; Ceriodaphnia dubia) |

Lead styphnate (15245-44-0)

| | |
|------------------------|---|
| LC50 - Fish [1] | 0.107 mg/l (96 h; Oncorhynchus mykiss; Lead) |
| EC50 - Crustacea [1] | 7 mg/l |
| NOEC chronic fish | 0.0189 – 1.559 mg/l (Fish; Lead) |
| NOEC chronic crustacea | 0.0017 – 0.496 mg/l (aquatic invertebrates; Lead) |

Barium nitrate (10022-31-8)

| | |
|----------------------|-----------|
| EC50 - Crustacea [1] | 9018 mg/l |
|----------------------|-----------|

zinc (7440-66-6)

| | |
|------------------------|---|
| LC50 - Fish [1] | 169 µg/l (96h; Oncorhynchus Mykiss) |
| EC50 - Crustacea [1] | < 0.1 µg/l (48h; Ceriodaphnia dubia) |
| ErC50 algae | 0.15 mg/l |
| NOEC chronic fish | 26 µg/L (30 d; Jordanella floridae) |
| NOEC chronic crustacea | 48 µg/L (21d; Daphnia magna; (OECD 211 method)) |

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| Diphenylamine (122-39-4) | |
|---------------------------------|---|
| EC50 - Crustacea [1] | 2 mg/l (48 h; Daphnia magna; (OECD 202 method)) |
| EC50 72h - Algae [1] | 2.17 mg/l (Raphidocelis subcapitata; (OECD 201 method)) |
| NOEC chronic algae | 0.0273 mg/l |

| tetrazene (109-27-3) | |
|-----------------------------|-----------|
| EC50 - Crustacea [1] | 0.14 mg/l |

12.2. Persistence and degradability

| DX-Cartridge | |
|--------------------------------------|--|
| Persistence and degradability | Not established. |
| glycerol trinitrate (55-63-0) | |
| Persistence and degradability | Inherently biodegradable. |
| Biodegradation | 92.2 % (84 h) |
| zinc (7440-66-6) | |
| Persistence and degradability | Not applicable for inorganic products. |
| Diphenylamine (122-39-4) | |
| Persistence and degradability | Not readily biodegraded. |
| Biodegradation | 26 % (28 d; (OECD 301D method)) |

12.3. Bioaccumulative potential

| DX-Cartridge | |
|---|--|
| Bioaccumulative potential | Not established. |
| glycerol trinitrate (55-63-0) | |
| Bioaccumulative potential | Low bioaccumulation potential (Log Kow < 4). |
| Lead styphnate (15245-44-0) | |
| BCF - Fish [1] | 1.553 |
| Partition coefficient n-octanol/water (Log Kow) | -2.19 (20 °C) |
| zinc (7440-66-6) | |
| Bioaccumulative potential | Bioaccumulation unlikely. |
| Diphenylamine (122-39-4) | |
| Partition coefficient n-octanol/water (Log Kow) | 3.82 (20,2 °C) |
| Bioaccumulative potential | Low bioaccumulation potential (Log Kow < 4). |

12.4. Mobility in soil

| glycerol trinitrate (55-63-0) | |
|--------------------------------------|---------------------------------------|
| Ecology - soil | Low potential for adsorption in soil. |
| Diphenylamine (122-39-4) | |
| Surface tension | 72.3 mN/m (20 °C; EU Method A.5) |

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12.5. Results of PBT and vPvB assessment

DX-Cartridge

This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII

This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII

12.6. Endocrine disrupting properties

No additional information available

12.7. Other adverse effects

Other adverse effects

No additional information available

Additional information

Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Regional waste regulation

Disposal must be done according to official regulations.

Product/Packaging disposal recommendations

Dispose in a safe manner in accordance with local/national regulations. Refer to manufacturer/supplier for information on recovery/recycling. At high temperatures may form : Response.

Additional information

Cartridge strips with unused cartridges: Hazardous waste due to risk of explosion. European waste catalogue: 16 04 01* - waste ammunition. If possible use up the cartridges or store them for your next project.

If not possible to use up the cartridges - The strip is mixed municipal waste and the cartridge itself is "waste ammunition" and has to be disposed of by an authorized/certified company.

If cartridges are used up: European waste catalogue: 20 03 01 - mixed municipal waste . The product (cartridges and strip) can be disposed of as household or factory waste.

Avoid release to the environment.

16 04 01* - waste ammunition

Ecological waste information

European List of Waste (LoW, EC 2000/532)

SECTION 14: Transport information

In accordance with ADR / IMDG / IATA / RID

| ADR | IMDG | IATA | RID |
|---|---|--|---|
| 14.1. UN number or ID number | | | |
| UN 0323 | UN 0323 | UN 0323 | UN 0323 |
| 14.2. UN proper shipping name | | | |
| CARTRIDGES, POWER DEVICE | CARTRIDGES, POWER DEVICE | Cartridges, power device | CARTRIDGES, POWER DEVICE |
| Transport document description | | | |
| UN 0323 CARTRIDGES, POWER DEVICE, 1.4S, (E) | UN 0323 CARTRIDGES, POWER DEVICE, 1.4S | UN 0323 Cartridges, power device, 1.4S | UN 0323 CARTRIDGES, POWER DEVICE, 1.4S |
| 14.3. Transport hazard class(es) | | | |
| 1.4S | 1.4S | 1.4S | 1.4S |
|  |  |  |  |

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| ADR | IMDG | IATA | RID |
|---|-----------------------------------|-----------------------------------|-----------------------------------|
| 14.4. Packing group | | | |
| Not applicable | Not applicable | Not applicable | Not applicable |
| 14.5. Environmental hazards | | | |
| Dangerous for the environment: No Marine pollutant: No | Dangerous for the environment: No | Dangerous for the environment: No | Dangerous for the environment: No |
| No supplementary information available | | | |

14.6. Special precautions for user

Overland transport

| | |
|---|---------------|
| Classification code (ADR) | 1.4S |
| Special provisions (ADR) | 347 |
| Limited quantities (ADR) | 0 |
| Excepted quantities (ADR) | E0 |
| Packing instructions (ADR) | P134, LP102 |
| Mixed packing provisions (ADR) | MP23 |
| Transport category (ADR) | 4 |
| Special provisions for carriage - Loading, unloading and handling (ADR) | CV1, CV2, CV3 |
| Special provisions for carriage - Operation (ADR) | S1 |
| Tunnel restriction code (ADR) | E |

Transport by sea

| | |
|------------------------------------|--------------------------------------|
| Special provisions (IMDG) | 347 |
| Limited quantities (IMDG) | 0 |
| Excepted quantities (IMDG) | E0 |
| Packing instructions (IMDG) | P134, LP102 |
| EmS-No. (Fire) | F-B |
| EmS-No. (Spillage) | S-X |
| Stowage category (IMDG) | 01 |
| Stowage and handling (IMDG) | SW1 |
| Flash point (IMDG) | |
| Properties and observations (IMDG) | See glossary of terms in appendix B. |
| MFAG-No | 114 |

Air transport

| | |
|--|------------|
| PCA Excepted quantities (IATA) | E0 |
| PCA Limited quantities (IATA) | Forbidden |
| PCA limited quantity max net quantity (IATA) | Forbidden |
| PCA packing instructions (IATA) | 134 |
| PCA max net quantity (IATA) | 25kg |
| CAO packing instructions (IATA) | 134 |
| CAO max net quantity (IATA) | 100kg |
| Special provisions (IATA) | A165, A802 |
| ERG code (IATA) | 3L |

Rail transport

| | |
|--------------------------------|-------------|
| Classification code (RID) | 1.4S |
| Special provisions (RID) | 347 |
| Limited quantities (RID) | 0 |
| Excepted quantities (RID) | E0 |
| Packing instructions (RID) | P134, LP102 |
| Mixed packing provisions (RID) | MP23 |

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| | |
|---|------|
| Transport category (RID) | 4 |
| Special provisions for carriage – Packages (RID) | W2 |
| Special provisions for carriage - Loading, unloading and handling (RID) | CW1 |
| Colis express (express parcels) (RID) | CE1 |
| Hazard identification number (RID) | 1.4S |

14.7. Maritime transport in bulk according to IMO instruments

Not applicable

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

15.1.1. EU-Regulations

REACH Annex XVII (Restriction List)

| EU restriction list (REACH Annex XVII) | | |
|--|---------------------|---|
| Reference code | Applicable on | Entry title or description |
| 3(a) | glycerol trinitrate | Substances or mixtures fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008: Hazard classes 2.1 to 2.4, 2.6 and 2.7, 2.8 types A and B, 2.9, 2.10, 2.12, 2.13 categories 1 and 2, 2.14 categories 1 and 2, 2.15 types A to F |
| 3(b) | glycerol trinitrate | Substances or mixtures fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008: Hazard classes 3.1 to 3.6, 3.7 adverse effects on sexual function and fertility or on development, 3.8 effects other than narcotic effects, 3.9 and 3.10 |
| 3(c) | glycerol trinitrate | Substances or mixtures fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008: Hazard class 4.1 |
| 30. | Lead styphnate | Substances which are classified as reproductive toxicant category 1A or 1B in Part 3 of Annex VI to Regulation (EC) No 1272/2008 and are listed in Appendix 5 or Appendix 6, respectively. |
| 63. | Lead styphnate | Lead and its compounds |
| 72. | Lead styphnate | The substances listed in column 1 of the Table in Appendix 12 |

REACH Annex XIV (Authorisation List)

Contains no substance(s) listed on REACH Annex XIV (Authorisation List)

REACH Candidate List (SVHC)

Contains substance(s) listed on the REACH Candidate List in concentrations $\geq 0.1\%$ or SCL: Lead styphnate (EC 239-290-0, CAS 15245-44-0)

PIC Regulation (Prior Informed Consent)

Contains substance(s) listed on the PIC list (Regulation EU 649/2012 concerning the export and import of hazardous chemicals): lead 2,4,6-trinitro-m-phenylene dioxide (15245-44-0), Diphenylamine (122-39-4)

POP Regulation (Persistent Organic Pollutants)

Contains no substance(s) listed on the POP list (Regulation EU 2019/1021 on persistent organic pollutants)

Ozone Regulation (1005/2009)

Contains no substance(s) listed on the Ozone Depletion list (Regulation EU 2024/590 on substances that deplete the ozone layer)

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Seveso Directive (Disaster Risk Reduction)

| Seveso III Part I (Categories of dangerous substances) | Qualifying quantity (tonnes) | |
|--|------------------------------|------------|
| | Lower-tier | Upper-tier |
| P1b EXPLOSIVES Explosives, Division 1.4 | 50 | 200 |

Explosives Precursors Regulation (EU 2019/1148)

Contains no substance(s) listed on the Explosives Precursors list (Regulation EU 2019/1148 on the marketing and use of explosives precursors)

Drug Precursors Regulation (EC 273/2004)

Contains no substance(s) listed on the Drug Precursors list (Regulation EC 273/2004 on the manufacture and the placing on market of certain substances used in the illicit manufacture of narcotic drugs and psychotropic substances)

15.1.2. National regulations

No additional information available

15.2. Chemical safety assessment

No chemical safety assessment has been carried out

SECTION 16: Other information

| Abbreviations and acronyms: | |
|-----------------------------|---|
| CAS-No. | Chemical Abstracts Service number |
| ADN | European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways |
| ADR | European Agreement concerning the International Carriage of Dangerous Goods by Road |
| ATE | Acute Toxicity Estimate |
| CLP | Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008 |
| DNEL | Derived-No Effect Level |
| EC50 | Median effective concentration |
| ED | Endocrine disruptor |
| EC-No. | European Community number |
| EN | European Standard |
| IATA | International Air Transport Association |
| IMDG | International Maritime Dangerous Goods |
| IOELV | Indicative Occupational Exposure Limit Value |
| LC50 | Median lethal concentration |
| LD50 | Median lethal dose |
| NOEC | No-Observed Effect Concentration |
| OECD | Organisation for Economic Co-operation and Development |
| N.O.S. | Not Otherwise Specified |
| OEL | Occupational Exposure Limit |
| PBT | Persistent Bioaccumulative Toxic |

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| Abbreviations and acronyms: | |
|------------------------------------|---|
| PNEC | Predicted No-Effect Concentration |
| REACH | Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006 |
| RID | Regulations concerning the International Carriage of Dangerous Goods by Rail |
| SDS | Safety Data Sheet |
| STP | Sewage treatment plant |
| TLM | Median Tolerance Limit |
| TRGS | Technical Rules for Hazardous Substances |
| VOC | Volatile Organic Compounds |
| WGK | Water Hazard Class |
| vPvB | Very Persistent and Very Bioaccumulative |
| NOAEL | No-Observed Adverse Effect Level |
| NOAEC | No-Observed Adverse Effect Concentration |
| LOAEL | Lowest Observed Adverse Effect Level |

Data sources

Supplier Safety Data Sheet. European Chemicals Agency, <http://echa.europa.eu/>.

| Full text of H- and EUH-statements: | |
|--|---|
| Acute Tox. 1 (Dermal) | Acute toxicity (dermal), Category 1 |
| Acute Tox. 2 (Inhalation:dust,mist) | Acute toxicity (inhalation:dust,mist) Category 2 |
| Acute Tox. 2 (Oral) | Acute toxicity (oral), Category 2 |
| Acute Tox. 3 (Dermal) | Acute toxicity (dermal), Category 3 |
| Acute Tox. 3 (Inhalation:dust,mist) | Acute toxicity (inhalation:dust,mist) Category 3 |
| Acute Tox. 3 (Oral) | Acute toxicity (oral), Category 3 |
| Acute Tox. 4 (Inhalation) | Acute toxicity (inhal.), Category 4 |
| Acute Tox. 4 (Inhalation:dust,mist) | Acute toxicity (inhalation:dust,mist) Category 4 |
| Acute Tox. 4 (Oral) | Acute toxicity (oral), Category 4 |
| Aquatic Acute 1 | Hazardous to the aquatic environment – Acute Hazard, Category 1 |
| Aquatic Chronic 1 | Hazardous to the aquatic environment – Chronic Hazard, Category 1 |
| Aquatic Chronic 2 | Hazardous to the aquatic environment – Chronic Hazard, Category 2 |
| Aquatic Chronic 3 | Hazardous to the aquatic environment – Chronic Hazard, Category 3 |
| Carc. 2 | Carcinogenicity, Category 2 |
| Expl. 1.1 | Explosives, Division 1.1 |
| Expl. 1.4 | Explosives, Division 1.4 |
| Eye Irrit. 2 | Serious eye damage/eye irritation, Category 2 |
| Ox. Sol. 2 | Oxidising Solids, Category 2 |

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| Full text of H- and EUH-statements: | |
|--|--|
| Repr. 1A | Reproductive toxicity, Category 1A |
| STOT RE 2 | Specific target organ toxicity – Repeated exposure, Category 2 |
| Unst. Expl. | Explosives, Unstable explosives |
| H200 | Unstable explosives. |
| H201 | Explosive; mass explosion hazard. |
| H204 | Fire or projection hazard. |
| H272 | May intensify fire; oxidiser. |
| H300 | Fatal if swallowed. |
| H301 | Toxic if swallowed. |
| H302 | Harmful if swallowed. |
| H310 | Fatal in contact with skin. |
| H311 | Toxic in contact with skin. |
| H319 | Causes serious eye irritation. |
| H330 | Fatal if inhaled. |
| H331 | Toxic if inhaled. |
| H332 | Harmful if inhaled. |
| H351 | Suspected of causing cancer. |
| H360Df | May damage the unborn child. Suspected of damaging fertility. |
| H373 | May cause damage to organs through prolonged or repeated exposure. |
| H400 | Very toxic to aquatic life. |
| H410 | Very toxic to aquatic life with long lasting effects. |
| H411 | Toxic to aquatic life with long lasting effects. |
| H412 | Harmful to aquatic life with long lasting effects. |

SDS EU HILTI

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.